

October 1, 2001

10 CFR Part 50
Section 50.73

U S Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

Docket No. 50-282 License No. DPR-42

**LER 1-01-04: Water Intrusion into a Control Rod Electrical Cabinet Results in
Dropped Rods Causing a Negative Flux Reactor Trip**

The Licensee Event Report for this occurrence is attached. No new commitments are made in this submittal. This event was reported via the Emergency Notification System in accordance with 10 CFR Part 50, Section 50.72, on August 1, 2001. Please contact us if you require additional information related to this event.


Mano Nazar
Site Vice President
Prairie Island Nuclear Generating Plant

cc: Regional Administrator - Region III, NRC
NRR Project Manager, NRC
Senior Resident Inspector, NRC
James Bernstein, State of Minnesota

Attachment

IE22

NRC FORM 366 (1-2001)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB NO. 3150-0104 EXPIRES 6-30-2001 <small>Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.</small>																																						
LICENSEE EVENT REPORT (LER) <small>(See reverse for required number of digits/characters for each block)</small>																																										
FACILITY NAME (1) Prairie Island Nuclear Generating Plant Unit 1			DOCKET NUMBER (2) 05000 282		PAGE (3) 1 OF 4																																					
TITLE (4) Water Intrusion into a Control Rod Electrical Cabinet Results in Dropped Rods Causing a Negative Flux Reactor Trip																																										
EVENT DATE (5) MO DAY YEAR 08 01 01		LER NUMBER (6) YEAR SEQUENTIAL NUMBER REV NO 01 - 04 - 00		REPORT DATE (7) MO DAY YEAR 10 01 01																																						
				OTHER FACILITIES INVOLVED (8) FACILITY NAME DOCKET NUMBER FACILITY NAME DOCKET NUMBER																																						
OPERATING MODE (9) 1		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check all that apply) (11)																																								
POWER LEVEL (10) 100		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>20.2201(b)</td> <td>20.2203(a)(3)(ii)</td> <td>50.73(a)(2)(ii)(B)</td> <td>50.73(a)(2)(ix)(A)</td> </tr> <tr> <td>20.2201(d)</td> <td>20.2203(a)(4)</td> <td>50.73(a)(2)(iii)</td> <td>50.73(a)(2)(x)</td> </tr> <tr> <td>20.2203(a)(1)</td> <td>50.36(c)(1)(i)(A)</td> <td>50.73(a)(2)(iv)(A)</td> <td>73.71(a)(4)</td> </tr> <tr> <td>20.2203(a)(2)(i)</td> <td>50.36(c)(1)(ii)(A)</td> <td>50.73(a)(2)(v)(A)</td> <td>73.71(a)(5)</td> </tr> <tr> <td>20.2203(a)(2)(ii)</td> <td>50.36(c)(2)</td> <td>50.73(a)(2)(v)(B)</td> <td>OTHER</td> </tr> <tr> <td>20.2203(a)(2)(iii)</td> <td>50.46(a)(3)(ii)</td> <td>50.73(a)(2)(v)(C)</td> <td rowspan="4">Specify in Abstract below or in NRC Form 366A</td> </tr> <tr> <td>20.2203</td> <td>50.73</td> <td></td> </tr> <tr> <td>20.2203</td> <td>50.73</td> <td></td> </tr> <tr> <td>20.2203</td> <td></td> <td></td> </tr> <tr> <td></td> <td>20.2203(a)(3)(i)</td> <td>50.73(a)(2)(ii)(A)</td> <td>50.73(a)(2)(viii)(B)</td> </tr> </table>				20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)	20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)	20.2203(a)(1)	50.36(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	73.71(a)(4)	20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)	20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER	20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A	20.2203	50.73		20.2203	50.73		20.2203				20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)
20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)																																							
20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)																																							
20.2203(a)(1)	50.36(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	73.71(a)(4)																																							
20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)																																							
20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER																																							
20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A																																							
20.2203	50.73																																									
20.2203	50.73																																									
20.2203																																										
	20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)																																							
LICENSEE CONTACT FOR THIS LER (12)																																										
NAME Leonard Sueper			TELEPHONE NUMBER (Include Area Code) 715-377-3352																																							
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																																										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX																																						
SUPPLEMENTAL REPORT EXPECTED (14)					EXPECTED SUBMISSION DATE (15)																																					
YES (If yes, complete EXPECTED SUBMISSION DATE). <input checked="" type="checkbox"/> NO					MONTH DAY YEAR																																					
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)																																										
<p>On August 1, 2001, Prairie Island Unit 1 experienced an automatic reactor trip due to negative flux rate. Following the trip, several control rods initially failed to provide rod bottom position indication. This required the operating crew to enter emergency operating procedures and initiate boration to compensate for the apparent loss of shutdown. With the exception of the erroneous rod position indication, the plant response and operator actions subsequent to the trip were as expected.</p> <p>The event was initiated by water intrusion into a control rod drive power supply cabinet. The water caused varistors in the 12 AC Control Rod Power Cabinet to malfunction. This, in turn, caused the Control Bank C2 control rods to drop into the core, resulting in the negative flux rate trip. The source of the water was spillage from an overhead room cooler drip tray. A partially plugged drip tray drain, combined with high ambient humidity, led to a condensation rate from the cooler coils that exceeded the capacity of the drain until the drip tray overflowed onto the control rod drive power supply cabinet below. Corrective actions include development of a preventative maintenance task to periodically inspect and clean the drip tray drains.</p> <p>The control rod position indication error was caused by an unanticipated bias (equating to approximately 8 steps) that was introduced by a revised calibration procedure. The control rod position indications were recalibrated using the previously accepted methodology.</p>																																										

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Prairie Island Nuclear Generating Plant Unit 1	05000 282	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2001 - 04 - 00			

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

EVENT DESCRIPTION

On August 1, 2001, Prairie Island Nuclear Generating Plant Unit 1 (PINGP-1) was operating at 100% power. Atmospheric dew point temperatures at the time were greater than 72 degrees F. At 0703 CST, an automatic reactor trip occurred due to negative flux rate. Immediately prior to the trip, an Apprentice Plant Attendant (APA) on routine rounds detected water from the drip tray beneath the 11 Control Rod Drive Room Unit Cooler overflowing onto the 12AC Control Rod Drive Power Cabinet¹ and surrounding floor. The reactor trip occurred as the APA was about to notify the Assistant Plant Equipment Operator. A review of plant data indicates the Control Bank C2 control rods energized by the 12AC power cabinet had dropped into the core, resulting in a negative flux rate reactor trip. Instrument and Control (I&C) technicians who responded to troubleshoot the malfunction detected moisture inside the 12AC cabinet. I&C personnel later demonstrated through bench testing of a spare that the stationary gripper varistors of the type installed in the cabinet indicated a significant reduction in phase-to-neutral and phase-to-phase resistance when exposed to a water mist. Inspection of the 11 Control Rod Drive Room Unit Cooler determined that the drip tray was full and the 1 inch drain line was partially obstructed. The blockage was cleared by plant workers.

Following the reactor trip, six (6) of twenty-nine (29) control rods initially failed to provide rod bottom light indications (instead indicating 15 – 20 steps). This was within the tolerance of the position indicator but did not cause the rod bottom bistables for these lights to actuate. The operating crew responded by borating in accordance with plant emergency operating procedures. The Auxiliary Feedwater pumps automatically started in response to indicated low steam generator levels. This is an expected response following a reactor trip from 100 percent power. The remainder of the transient recovery proceeded normally.

CAUSE OF THE EVENT

The cause of the event was the lack of preventative maintenance on the 11 Control Rod Drive Room Unit Cooler drip tray drain². High ambient humidity at the time of the event resulted in a condensation rate on the cooling coils that exceeded the drainage rate through the partially blocked drain line. Contributing factors include the location of the unit cooler which is directly above the 12AC Power Cabinet. Also, there was a similar event occurrence on Unit 2 in 1982. During that event, water seeped into the 21BD Control Rod Drive Power Supply Cabinet and blew a fuse. The Corrective Action Program was not utilized to fully document and evaluate this condition. Instead, informal work processes were relied on.

¹ EIIIS System Code: AA; Component Code: VRC

² EIIIS System Code: VF; Component Code: DRN

(1-2001)

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Prairie Island Nuclear Generating Plant Unit 1	05000 282	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
		2001 - 04 - 00			

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

The cause of the erroneous control rod position indication following the reactor trip was a calibration bias (equating to approximately 8 steps) that was inadvertently introduced by a recent calibration procedure change. The change failed to anticipate differences between the test equipment used to develop the procedure and actual circuit output. The circumstances that led to the introduction of the bias are still under investigation.

ANALYSIS OF THE EVENT

The event is reportable under 10CFR50.73(a)(2)(v)(A) as an automatic actuation of the reactor protection system in response to the automatic reactor trip. The health and safety of the public were unaffected since the plant systems, with the exception of control rod position indication, responded to the trip as designed.

Impact of Event on Performance Indicators

This event affects the number of unplanned scrams per 7,000 critical hours. However, the unit has had three or fewer scrams within the last 7,000 critical hours.

Risk Significance

This event involved an unplanned reactor trip without impact to systems required for normal post-trip decay heat removal. The additional boron added to the reactor coolant system did not present a significant challenge to successful operator response nor to the ability of mitigating systems to perform as required. This type of event was anticipated in the design of the plant, and plant procedures and training adequately cover the operator actions that are necessary. As such, the risk significance of this event is very low.

CORRECTIVE ACTIONS

Immediate

1. The blockage in the unit cooler drip tray was cleared by plant workers.
2. The control rod position indications were recalibrated using the previously accepted methodology.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Prairie Island Nuclear Generating Plant Unit 1	05000 282	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
		2001 - 04 - 00			

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)**Planned**

1. A preventative maintenance program will be established to periodically inspect and clean the drip tray drains on the Unit 1 and Unit 2 Control Rod Drive Unit Coolers.
2. The status of all plant Unit coolers and air handlers near sensitive plant equipment will be evaluated. Preventative maintenance programs, the installation of physical barriers or splash guards, and the removal or relocation of equipment will be initiated as needed.
3. The cause of the calibration bias that led to the inaccurate control rod position indications is currently being investigated. Corrective actions to prevent recurrence will be initiated in accordance with the Prairie Island Corrective Action Program.

These corrective actions have been assigned a high priority within the Prairie Island Corrective Actions Program.

FAILED COMPONENT IDENTIFICATION

None.

PREVIOUS SIMILAR EVENTS

A similar event occurred in May 1982 on Unit 2 due to water intrusion from a drip pan onto the 12BD Control Rod Drive Power Supply Cabinet. This resulted in a blown fuse.